

Lake Michigan 2020 and Lake Erie 2019 CSMI Field Year Overview

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GLASS

24th Annual Science Vessel Coordination Workshop 2020

January 9, 2016

2012 Great Lakes Water Quality Agreement

The Lakewide Annex (Annex 2) shall:

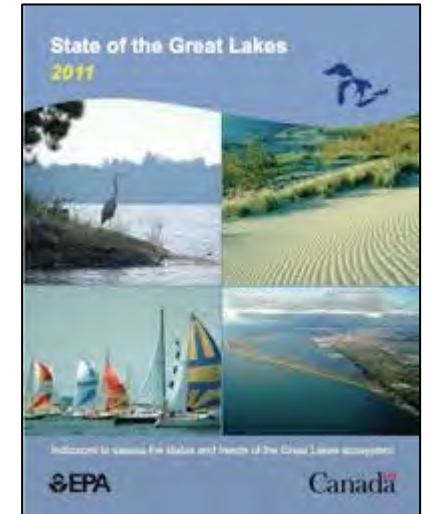
- Assess the status of each Great Lake
- Develop Lakewide Action and Management Plans to address environmental stressors (on a lakewide scale) that adversely affect the Waters of the Great Lakes
- Identify science priorities for each lake



2012 Great Lakes Water Quality Agreement

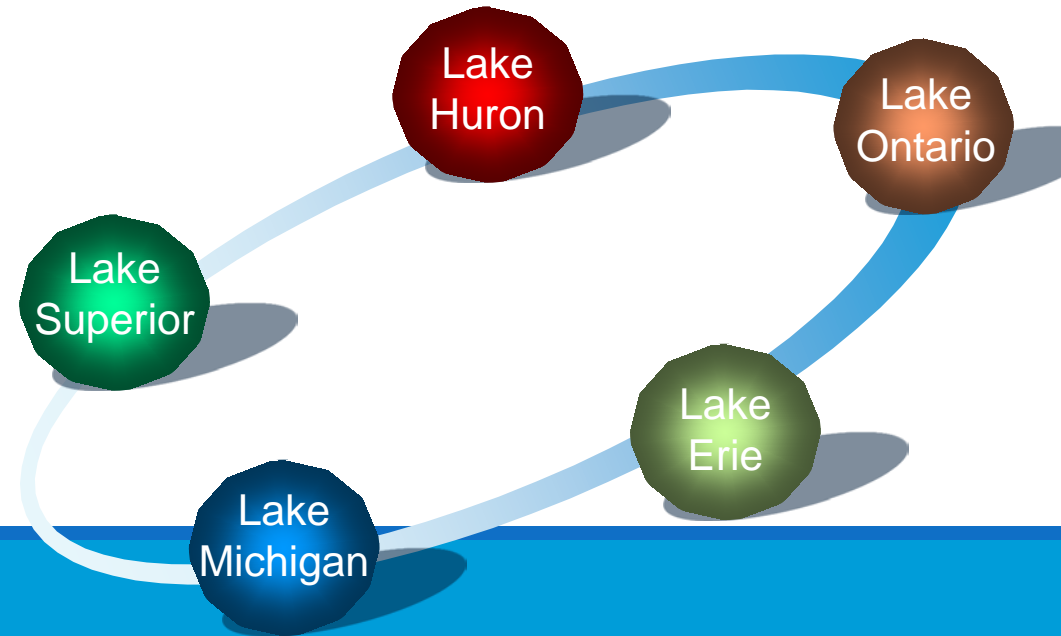
The Science Annex (Annex 10) shall:

- Utilize science-based ecosystem indicators to assess the state of the Great Lakes
- Publicly describe basin-wide environmental trends and lake-specific conditions through a State of the Great Lakes Report
- Implement a cooperative science and monitoring initiative to help coordinate science programs on the Great Lakes (CSMI)



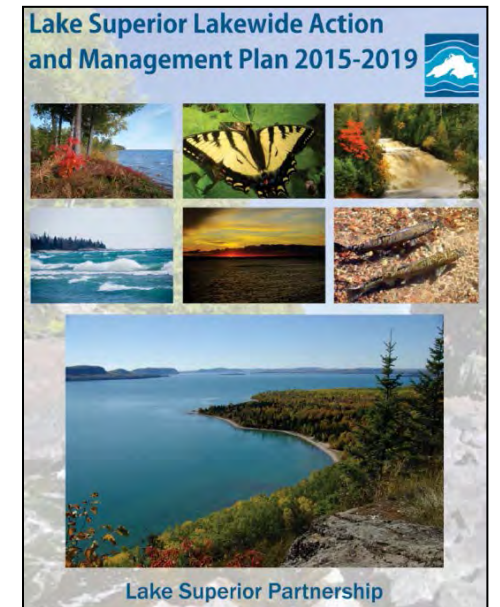
CSMI Background

- Cooperative Monitoring Initiative (CMI) started in 2002 to coordinate monitoring
 - Premise: focus resources on a few key issues on one lake each year
- Expanded mandate to include research coordination (2006)
- Connecting channels added (2009)
- CSMI follows a 5 year rotational cycle



CSMI Objective = Improved binational coordination of science and monitoring to achieve:

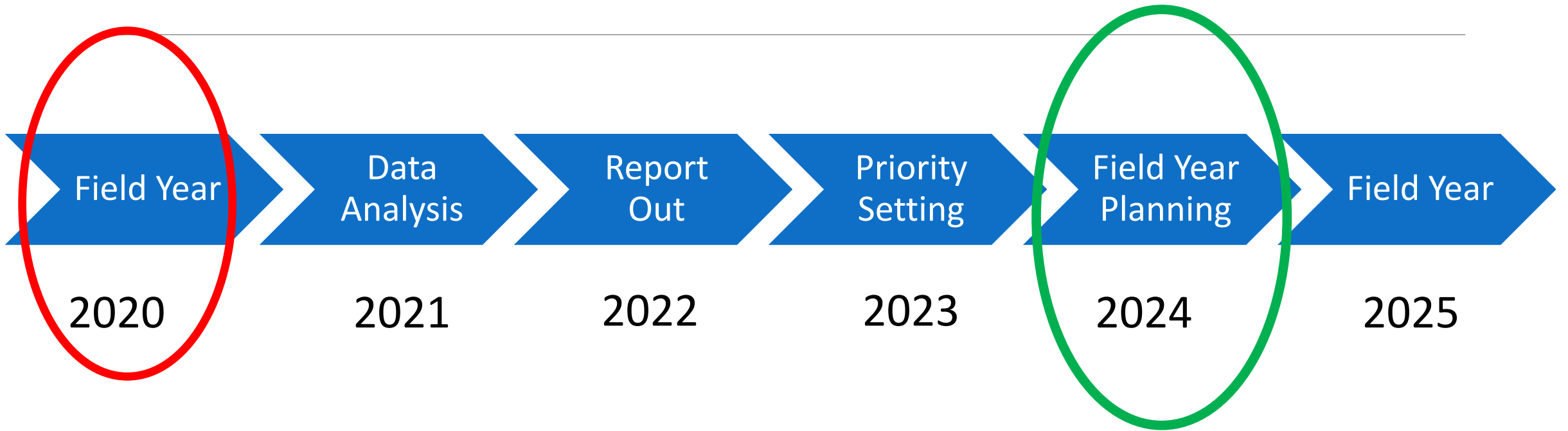
- Field years that satisfy knowledge needs of Lake Partnerships
- Informed decision-making via input to Lake Partnerships as they develop LAMPs
- Optimization of programs
- Improved reporting, networking



Who is working on CSMI?

- Core Task Team
 - U.S. federal core (EPA; USGS; NOAA; FWS)
 - Canadian federal core (ECCC and DFO)
 - Rotating provincial, state and tribal representatives
- Extended Task Team
 - Sea Grant, IJC, academia

LAKE MICHIGAN CSMI TIMELINE



Field Year
2020

CSMI Cycle (year 1)

Field studies to address LAMP priorities

- Federal agencies
- State agencies
- Tribes and First Nations
- Universities



Other leveraged research

- IL-IN Sea Grant funded research on microbial and nearshore foodwebs

Outreach

- live broadcasts to schools, #CSMI2015, lakeguardian.org blog

Analysis Year
2021

CSMI Cycle (year 2)

Laboratory and statistical analysis

Preliminary results

- Technical sessions at IAGLR
- Progress reports

The cover image for the Lake Ontario 2013 CSMI Progress Report, showing a sunset over the water and a red buoy.

Lake Ontario 2013 CSMI Progress Report

CSMI Supports Management Needs
The Cooperative Science and Monitoring Initiative (CSMI) is a binational effort that rotates through the Great Lakes on a 5-year cycle coordinating scientific monitoring and research to better understand the Great Lakes ecosystem. CSMI informs Great Lakes management programs such as Lakewide Action and Management Plans (LAMPs) and Great Lakes Fishery Commission's Lake Committees as well as provinces, states, tribes and Metis in support of US & Canadian Great Lakes Water Quality Agreement commitments. In 2013, the Lake Ontario effort took a collaborative approach to determine the source and fate of nutrients and food web production across trophic levels. Five research themes included:

- Nutrient loading and fate
- Nearshore and offshore linkages
- Dynamics of primary & secondary production
- Fish production, distribution & diet
- Trophic transfer & food web mass-balance

This research will address management and research priorities including nutrient loading and management, the role of invasive species, identifying energy pathways between offshore-and nearshore habitats, and the ability of the lake to sustain fisheries. This progress report presents preliminary information; it should not be referenced and does not provide a complete representation of all CSMI or Lake Ontario related research.

Collaboration Is Key
This 2013 CSMI, system-wide investigation of Lake Ontario would not be possible without the direct and in-kind support contributed to CSMI 2013 from US Environmental Protection Agency (EPA), Canada Ontario Agreement (COA), Environment Canada (EC), New York State Department of Environmental Conservation (NYSDEC), US Geological Survey (USGS), US Fish and Wildlife Service (USFWS), Ontario Ministry of Natural Resources (OMNR), Fisheries and Oceans Canada (DFO), National Oceanic and Atmospheric Administration (NOAA), and academics from Cornell, University of Windsor, Buffalo State, University of Michigan, University of Buffalo, SUNY Brockport, Syracuse, SUNY ESF, Bowling Green, Clarkson, and Notre Dame.

Thanks For Your Support
The tireless efforts of vessel crews, administrative, and technical operations staff were critical for ensuring a safe and productive work environment during 2013 in both laboratory and vessel settings. The EPA's *Lake Guardian* & Canadian Coast Guard research vessel *Limnos* and *Kelso* provided wide spatial sampling while the new vessels in the fleet, including the OMNR *RV Ontario Explorer* and USGS *RV Kaho*, sampled monthly along transects extending from nearshore to deep-water habitats. Smaller research vessels, such as the USGS *RV Lacustris* and DFO's *RV Leslie J.* played important roles collecting nearshore samples and filling in for offshore sampling when large vessels were unavailable.

A satellite image of Lake Ontario showing a large area of white, indicating a "whiting event" where calcium carbonate particles are suspended in the water.

A photo from the International Space Station highlights a late-summer "whiting event" in Lake Ontario Aug 24, 2013. These events occur at certain temperature and water acidity levels that cause fine particles of calcium carbonate to precipitate.

Save the Date!
CSMI researchers will present more thorough assessments of Lake Ontario's changing ecosystem at the upcoming International Association of Great Lakes Research annual conference at Hamilton, Ontario on May 26-30, 2014. For more information visit www.iaglr.org.

The IAGLR logo, featuring a stylized city skyline and the text "IAGLR" and "GREAT LAKES RESEARCH IN TRANSITION".

Reporting Year
2022

CSMI Cycle (year 3)

Publication of results

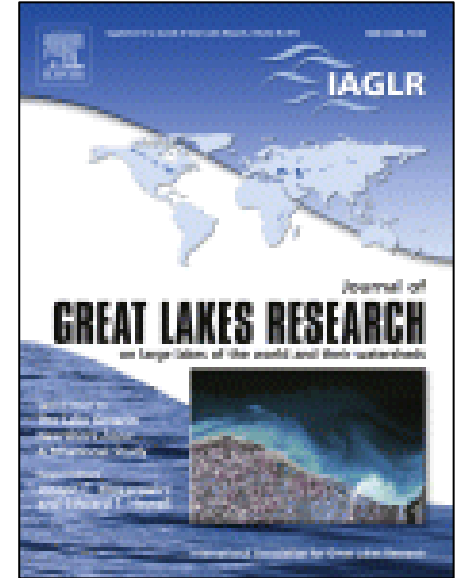
- Peer-reviewed manuscripts
- Synthesis report for managers

Meetings and workshops

- State of the Lake meeting (with IAGLR, Sea Grant, IJC)
- Coordinate with GLFC lake reports

Outreach

- Lake Partnerships and GL Sea Grant Network





Priorities Year
2023

CSMI Cycle (year 4)

Review results of previous field year

- Use results to inform LAMP development (Lake Partnerships)
- Identify data gaps and emerging issues (Lake Partnerships, Science Annex)

Set LAMP data needs and priorities for next field year

- Input from partners and outside sources
- Agencies may announce specific RFA(s)

Planning Year
2024

CSMI Cycle (year 5)

Logistical planning for upcoming field year

- Award RFA(s)
- Research and vessel coordination among partners

Outreach/promotion

Lake Michigan Cooperative Science and Monitoring Initiative 2015

The Cooperative Science and Monitoring Initiative (CSMI) is a binational effort that coordinates monitoring and research efforts on each Great Lake over a five-year cycle to improve understanding of aquatic ecosystems. CSMI field sampling is guided by priorities identified in Lakewide Action and Management Plans (LAMPs) and the results inform the development of future management programs.

The 2015 CSMI will coordinate a system-wide investigation of the links between Lake Michigan nearshore and offshore habitats. This will address a key knowledge gap identified by the Lake Michigan LAMP and the fishery management community: understanding the distribution and abundance of nutrients and biota such as invertebrates and fish across a nearshore to offshore gradient. The results will facilitate the development of the nearshore strategy called for in the 2012 Great Lakes Water Quality Agreement.

Illinois-Indiana Sea Grant hopes to provide regular updates on the progress of the 2015 CSMI effort through 2016. Although these will not deliver scientific results commensurate with a peer-reviewed publication, our goal is to provide updates on sampling progress and the key scientific questions being addressed.

We encourage interested stakeholders to contact Paris Collingsworth at pcollins@iurdu.edu with feedback on the kinds of information they want reported.



What is going on in *ONE* year across lakes? 2020

Lake Michigan – Field year

Lake Erie – Data analysis from 2019 field year

Lake Ontario – Reporting out workshop from 2018 field year

Lake Huron – Identifying priorities for 2022 field year

Lake Superior – Planning for 2021 field year



2019 CSMI Lake Erie Harmful Algal Blooms/Hypoxia Survey



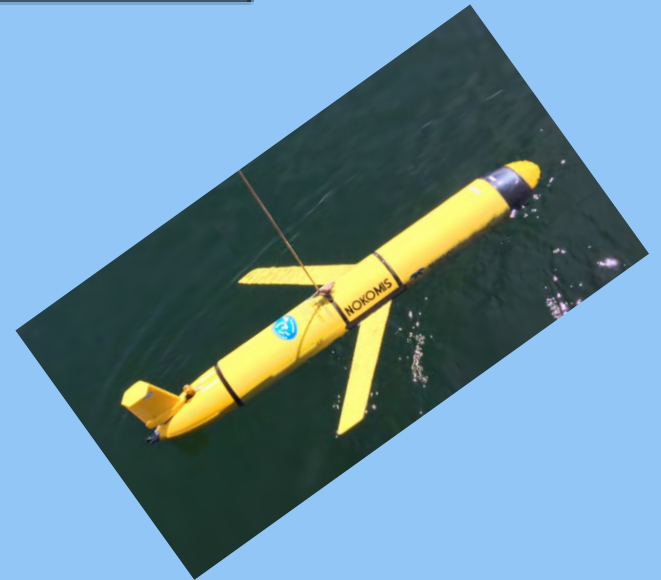
RV *Lake Explorer II* (operated by the U.S. EPA ORD)



CCGS *Limnos* (operated by ECCC and DFO, Canada)



RV *Lake Guardian* (Operated by GLNPD)



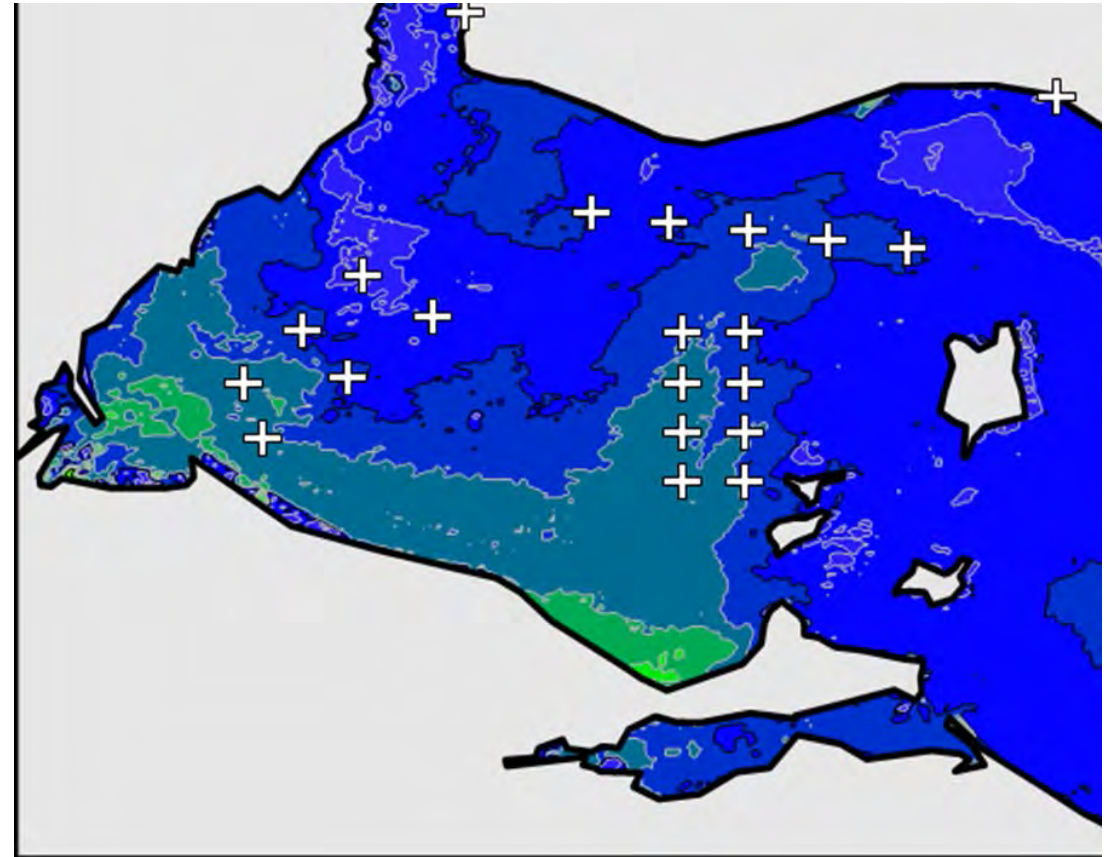
Example – 2019 Lake Erie

Priority setting

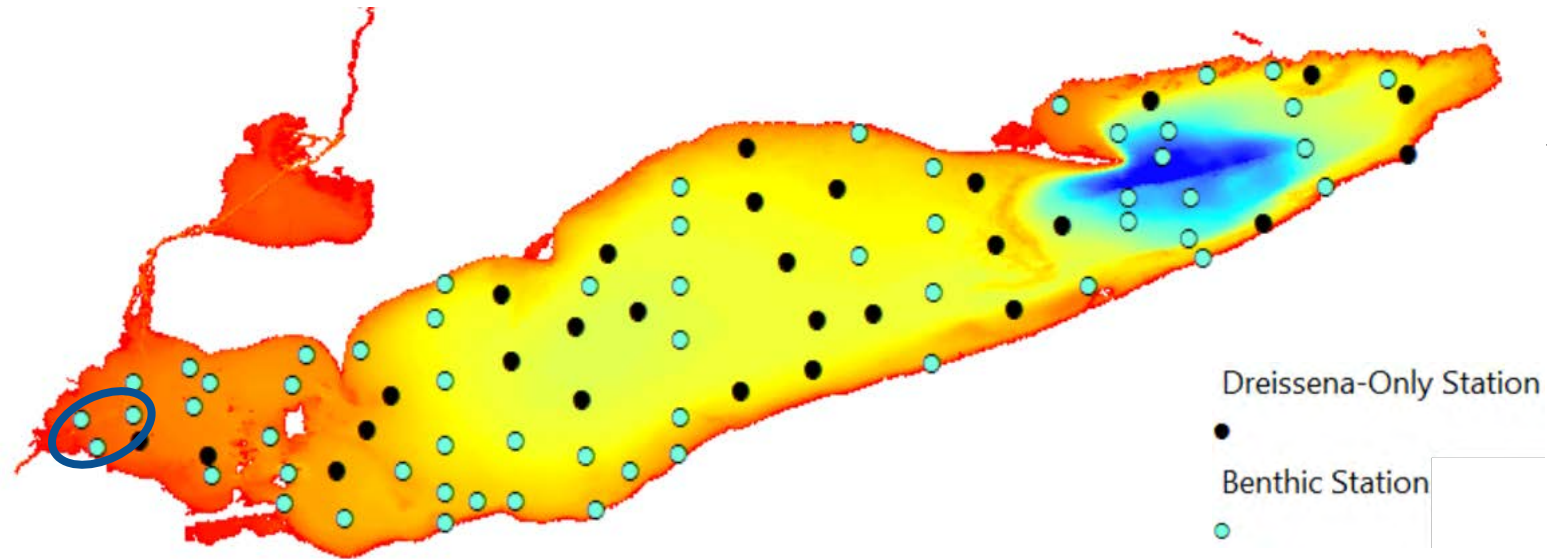
- How do HABS influence food webs?

Field survey

- EPA, ECCC, DFO, OSU and ODNR



2019 CSMI Lake Erie benthos survey – EPA and NOAA vessels



88 Stations (60 total benthos stations plus 28 Dreissena-only stations)

43 underwater video transects (sled and dropdown camera restricted to eastern and central basin)

Sample Type	Benthos	Dreissena-only	Granulometry	Sediment Nutrients	Sled Tows	Drop-down Camera
# Stations	60	28	88	88	43	82

September 2019 CSMI benthos survey - USGS R/V Muskie



Lake Michigan Vessel Coordination 2020

- Just getting Started
- Sample Lower Trophic Level
- Sample Larval Fish
- May
 - Lake Guardian Western Side of the Southern Basin
 - Laurentian Eastern Side of the Southern Basin
- July
 - Significant Effort to Sample Larval Fish across the whole lake
 - USGS Sturgeon and Articus
 - Lake Guardian
 - Laurentian
 - Lake Explorer 2

Thank you

Questions

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